Space Weather Forecast

Issued on Thursday, 18 August 2022 at 12:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor storms or G2/Moderate storms day 1 or 2 (18th or 19th Aug). Further Moderate flares (R1-R2 Radio blackouts) likely throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity is Moderate with four Moderate-class flares in the last 24 hours. This was from the relatively complex region in the southwest quadrant. There are four numbered sunspot regions and two small un-numbered on the visible disc at present. The region mentioned above is the largest and most active region and is displaying strong spots with magnetic complexity. The two other most notable spot regions are a bi-polar region in the northeast quadrant, and another bi-polar group now in the northwest quadrant. Although only isolated Common-class flares have been produced by these. Other regions are small and unremarkable.
A CME (Coronal Mass Ejection) associated with one or more flares in short-succession from the largest sunspot region on the 16th has been analysed and may give a glancing blow to Earth on the 19th, though the bulk of the ejecta appears to pass below Earth. Two low level Moderate flares from the active sunspot region in the southwest, and a filament lift off just to the west, on the UTC afternoon of the 17th produced a combination of two notable CMEs. These are modelled to mainly pass below Earth. However, there may still be some possible glancing influence from these later on 19th.

Solar Wind / Geomagnetic Activity: The solar wind increased gradually but rather erratically from slightly elevated to elevated levels. The Interplanetary Magnetic Field was Moderate. The north-south component varied moderately. Parameters appear to indicate a likely CME arrival around 17/1600 UTC. Resultant Geomagnetic activity was Unsettled (Kp 3), before increasing G1-G2/Minor-Moderate Storm (Kp 5-6) between 17/1500-2400 UTC, as recorded by BGS.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

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Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate with a slight chance of High levels. The most likely source region for any larger flares would be from the larger magnetically complex region in the southwest quadrant.

Solar Wind / Geomagnetic Activity: Solar winds are currently at elevated levels due to ongoing CME influence from the 14th and 15th August CME arrival, and probable high speed stream influence from coronal hole 14. The combined effect of one or more CMEs that left the sun on the 16th August may give a glancing blow at Earth either late on the 18th (Day 1) or early on 19th August (Day 2). Also, the CMEs observed on 17th may give some glancing influence later on 19th, perhaps into early 20th, although this is low confidence. Therefore, solar winds are expected to remain enhanced through much of the period with the HSS and also with the possibility of further CME influences through Day 2, perhaps into Day 3. Wind speeds should then begin to decline into Day 4 (21st Aug).
Corresponding geomagnetic activity is expected to be Unsettled to Active with a chance of G1/Minor Storms or G2/Moderate Storms. A risk of further G1/Minor Storms carries through Day 2 (19th), perhaps into early Day 3 (20th), before reducing more confidently into Day 4 (21st).

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, but there is a slight chance of an S1 or greater event. This is mainly due to the more complex region which is now in the southwest quadrant of the Sun, where any proton events are more likely to reach Earth.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	40	20	5
Strong	G3	No	10	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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